8.1 sequences

$a_n = \frac{(-1)^n}{n^2+1}$ function with domain $= \{1,2,3,4,\ldots\}$

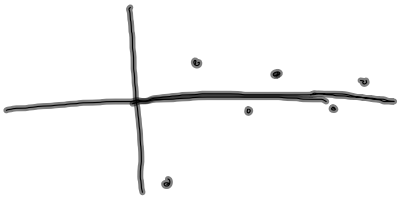
$a_1 = -\frac{1}{2}$

$a_2 = \frac{1}{5}$ or $a_n = \{-\frac{1}{2}, \frac{1}{5}, -\frac{1}{10}, \ldots\}$ (a_1 a_2 a_3)

$a_3 = -\frac{1}{10}$

$\vdots$

graph: dots



a_n converges to 0

$\lim_{n\to\infty} \frac{(-1)^n}{n^2+1} = 0$

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arithmetic sequence - common difference

linear

$a_n = \{-5, -2, 1, 4, 7, \ldots\}$ (3 3 3 3)

$a_n = a + (n-1)d$

$a = a_1$ first term

$d =$ common difference

$n =$ number of terms

$a_n = -5 + (n-1)3$

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recursive definition

$\{-5, -2, 1, 4, 7, 10 \ldots\}$

"add 3"

$a_n = a_{n-1} + d$, need a_1

$a_n = a_{n-1} + 3$

$U(n) = U(n-1) + 3 \qquad a_1 = -5$

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geometric sequences - common ratio r

$1, 2, 4, 8, 16, \ldots$ diverges exponential

$r = 2$

$a_n = a \cdot r^{n-1} \qquad a = a_1$

$a_n = 1 \cdot 2^{n-1}$ n^{th} term eqn (explicit eqn)

recursive

$a_n = a_{n-1} \cdot r$, need a_1

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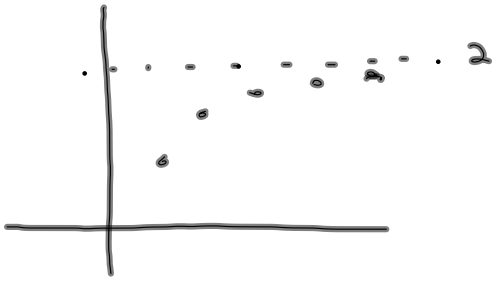
$a_n = \frac{2n-1}{n}$ converge or diverge

$\lim_{n\to\infty} \frac{2n-1}{n} = 2$



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converge? if so, to what?

$a_n = \frac{\sin(n)}{n} = 0$

$a_n = \frac{\cos(n)}{n} = 0$

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